Using Energy Conservation, Green Energy, Green Infrastructure and EPA's CREAT Program, to Reduce Carbon Footprint & Vulnerability to Climate Change

Andrew Kricun, P.E., BCEE
Executive Director/Chief Engineer
Camden County Municipal Utilities Authority

January 18, 2018

April 2017

American Society of Civil Engineers

Gives the Nation's Water Infrastructure a

"D+" Grade

Climate History – Hurricane Sandy October 2012

Flooding in NJ shore towns- Hurricane Sandy

Flooding in NJ shore towns- Hurricane Sandy *(cont'd)*

Floodwaters from Hurricane Sandy not only buried cars, but overwhelmed sewage treatment plants, which released billions of gallons of untreated waste into the environment

Conclusion-

The Nation's water infrastructure is inadequate to meet the requirements of how the climate is now; climate change will only widen that gap.

Camden County Municipal Utilities Authority (CCMUA)

- Services 500,000 customers in Southern New Jersey
- Design Flow: 80 MGD
- Average Flow: 58 MGD
- Secondary, pure oxygen activated sludge treatment
- Discharges to Delaware River

CCMUA Climate Change Vulnerabilities

- Loss of Power
- Rise in Delaware River elevation
  - wastewater treatment plant more prone to flooding and corresponding equipment damage
  - combined sewer system will see higher tides and corresponding increase of flooding of homes, streets & parks

CCMUA Climate Change Vulnerabilities *(con't)*

- Increased rainfall volumes
  - increased pressure on finite capacity of wastewater treatment plant and combined sewer system
  - increased probability of combined sewage flooding and overflows

Resiliency Measures Already Implemented- Energy Conservation & Green Energy

- Energy Audit
- Energy conservation measures
- Solar panels
- Digestion/Combined heat and power
- Sewage heat recovery

Resiliency Measures Already Implemented- Green & Grey Infrastructure

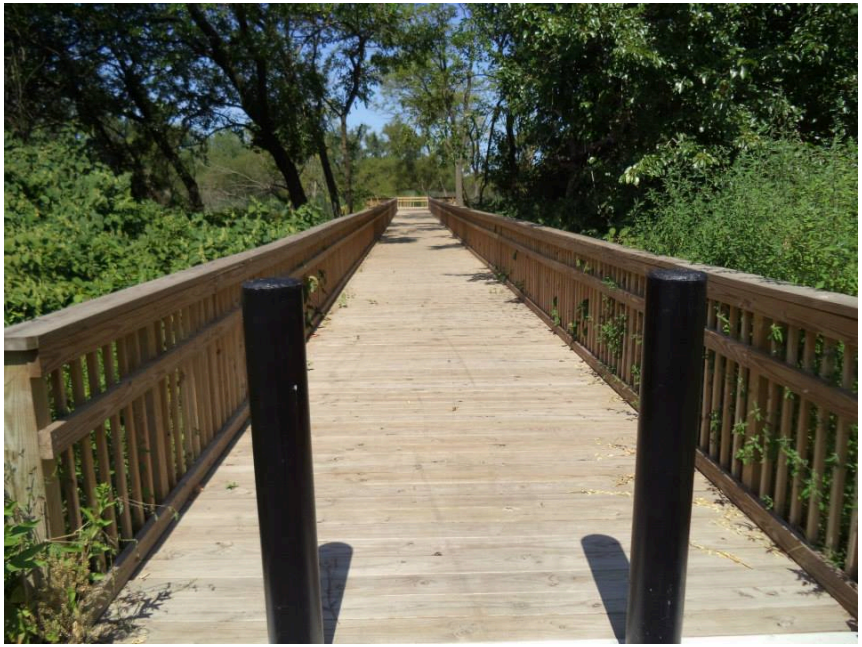
- Water Conservation Ordinance adopted
- Optimization of operations & maintenance of sewer system
- Grey Infrastructure upgrades
  - pipe replacements
  - pipes lined
  - infiltration/inflow removal
  - combined sewer separation
- Green Infrastructure
  - rain gardens
  - rain barrels
  - stream daylighting
  - depaving projects

Waterfront South Rain Gardens

Green Infrastructure on Brownfield Sites- *Before & After…*

Baldwin's Run Stream Daylighting Project- *Before….*

Baldwin's Run Stream Daylighting Project- *After…*



Phoenix Park Project- *Before…*

Phoenix Park Project- *After…*

CCMUA's Continuing Climate Change Vulnerability

- Despite green energy & green infrastructure initiatives, CCMUA still vulnerable to storms like Superstorm Sandy (climate history!), and to future climate change
- USEPA Climate Change Task Force- CREAT

CCMUA's CREAT Assessment Goals

- Understand system's vulnerabilities to climate change impacts, particularly river elevation rises and increased rainfall
- Harness existing wherewithal and resources to develop a systematic approach to climate change vulnerabilities
- Identify shortfalls in existing wherewithal, in the face of climate change, and plan accordingly

Results of CREAT Analysis for Camden

- CCMUA very vulnerable to severe rain events
- Delaware River expected to rise by 18 inches by 2050

Planning & Design Consequences

- Accelerating green energy program, with a goal to be off the grid entirely as soon as possible
- Accelerating green & grey infrastructure program to shed stormwater burden
- All designs must factor in 18-inch river level rise predicted by CREAT
- Planning for “seawall” to protect plant

CCMUA's Energy Resiliency Goal- Implement Sustainability Loop

- Receive 4MW of green energy from nearby trash to steam incinerator
- Send 1MGD of plant effluent to incinerator for cooling water

Planned Outcome

CCMUA will be entirely independent of the grid, with reduced vulnerability to power outages, reduced carbon footprint…and lower electricity costs as well by 2020

CCMUA's Flooding Reduction Goal- Accelerate Long Term CSO Control Plan

- Ensure that Camden City's CSO system is cleaned out and functioning at full volumetric capacity
- Upgrade Camden City's CSO system to increase conveyance capacity
- Expand CCMUA's wastewater treatment plant to receive 20-40% more flow during rain events

Planned outcome

Eliminate flooding in Camden City for at least the one-year storm by 2020

Benefits of CREAT

- Detailed analysis of vulnerabilities to climate change
- Catalog of possible improvements and upgrades
- Links to resources to assist in planning & implementation
- Links to best practices by fellow utilities that can be duplicated
- Reporting function

Learn More About USEPA's CREAT Program

https://www.epa.gov/crwu/build-resilience-your-utility

Conclusions

- Few cleanwater utilities are adequately prepared for the climate as it is now, as shown by storms like Hurricane Sandy in 2012
- Such storms can lead to catastrophic failures that have significant adverse public health, environmental and economic impact
- Climate change is projected to make the challenge even more difficult to meet
- USEPA's CREAT model is an extremely useful tool for utilities to plan for the challenges posed by climate change

Thanks for Listening!

If you would like more information, please contact:

Andrew Kricun, P.E., BCEE
Executive Director / Chief Engineer
Camden County Municipal Utilities Authority
Camden, New Jersey
856-583-1223
andy@ccmua.org